

Appl. No. 10/709,197
Amdt. dated September 08, 2005
Reply to Office action of June 14, 2005

Amendments to the Claims:

Claims 1-9. (cancelled)

Claim. 10 (original)

5 A proportional_to_Vt voltage amplifier, comprising:
a transconductance unit for generating a first current according to a first input
voltage; and
a transresistance unit, coupled to a reference voltage, for generating a first output
voltage according to the first current, wherein the difference between the first
10 output voltage and the reference voltage is proportional to a thermal voltage.

Claim. 11 (original)

The proportional_to_Vt voltage amplifier of claim 10, wherein the transconductance
unit comprises:
15 an operational amplifier having a first input end, a second input end, and an output
end, wherein the first input end couples to the first input voltage; and
a first resistor having one end being coupled to the second input end and the output
end of the operational amplifier, and the other end being coupled to ground;
wherein the first current flows through the first resistor.

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Claim. 12 (original)

The proportional_to_Vt voltage amplifier of claim 10 further comprising:
a first current mirror, coupled to the transconductance unit, for generating a
second current according to the first current.

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Claim 13. (original) The proportional_to_Vt voltage amplifier of claim 12, wherein
the transresistance unit comprises:

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a first transistor for receiving the reference voltage;
a second transistor having a first end coupled to the first current mirror, wherein the
second transistor is for generating the first output voltage;
a second current mirror coupled to the first transistor and the second transistor; and
5 a first bias current source coupled to the first transistor and the second transistor for
providing a first bias current.

Claim 14. (original) The proportional_to_Vt voltage amplifier of claim 13, wherein
the second current mirror comprises:
10 a third transistor having a first and a second ends coupled to the first transistor; and
a fourth transistor having a first end coupled to the second transistor and a second
end coupled to the gate of the third transistor.

Claim 15. (original) The proportional_to_Vt voltage amplifier of claim 10, wherein
15 the proportional_to_Vt voltage amplifier is a half circuit of a differential
proportional_to_Vt amplifier.

Claim 16. (new) A proportional_to_Vt voltage amplifier, comprising:
a transconductance unit for generating a first current according to a first input
20 voltage; and
a transresistance unit, coupled to a reference voltage, for generating a first output
voltage according to the first current, wherein the difference between the first
output voltage and the reference voltage is proportional to a thermal voltage;
wherein the transconductance unit comprises:
25 an operational amplifier having a first input end, a second input end, and an output
end, wherein the first input end couples to the first input voltage; and
a first resistor having one end being coupled to the second input end and the output
end of the operational amplifier, and the other end being coupled to ground;

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wherein the first current flows through the first resistor.

Claim 17. (new) The proportional_to_Vt voltage amplifier of claim 16 further comprising:

5 a first current mirror, coupled to the operational amplifier unit, for generating a second current according to the first current.

Claim 18. (new) The proportional_to_Vt voltage amplifier of claim 17, wherein the transresistance unit comprises:

10 a first transistor for receiving the reference voltage;
a second transistor having a first end coupled to the first current mirror, wherein the second transistor is for generating the first output voltage;
a second current mirror coupled to the first transistor and the second transistor; and
a first bias current source coupled to the first transistor and the second transistor for
15 providing a first bias current.

Claim 19. (new) The proportional_to_Vt voltage amplifier of claim 18, wherein the second current mirror comprises:

20 a third transistor having a first and a second ends coupled to the first transistor; and
a fourth transistor having a first end coupled to the second transistor and a second end coupled to the gate of the third transistor.

Claim 20. (new) The proportional_to_Vt voltage amplifier of claim 16, wherein the proportional_to_Vt voltage amplifier is a half circuit of a differential proportional_to_Vt amplifier.

Claim 21. (new) A proportional_to_Vt voltage amplifier, comprising:
a transconductance unit for generating a first current according to a first input

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voltage;

a transresistance unit, coupled to a reference voltage, for generating a first output voltage according to the first current, wherein the difference between the first output voltage and the reference voltage is proportional to a thermal voltage;

5 and

a first current mirror, coupled to the transconductance unit, for generating a second current according to the first current;

wherein the transresistance unit further comprises:

10 a first transistor for receiving the reference voltage;

a second transistor having a first end coupled to the first current mirror, wherein the second transistor is for generating the first output voltage;

15 a second current mirror coupled to the first transistor and the second transistor; and

a first bias current source coupled to the first transistor and the second transistor for providing a first bias current.

Claim 22. (new) The proportional_to_Vt voltage amplifier of claim 21, wherein the transconductance unit comprises:

20 an operational amplifier having a first input end, a second input end, and an output end, wherein the first input end couples to the first input voltage; and

a first resistor having one end being coupled to the second input end and the output end of the operational amplifier, and the other end being coupled to ground;

wherein the first current flows through the first resistor.

25 Claim 23. (new) The proportional_to_Vt voltage amplifier of claim 21, wherein the second current mirror comprises:

a third transistor having a first and second ends coupled to the first transistor; and

a fourth transistor having a first end coupled to the second transistor and a second

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end coupled to the gate of the third transistor.

Claim 24. (new) The proportional_to_Vt voltage amplifier of claim 21, wherein the proportional_to_Vt voltage amplifier is a half circuit of a differential proportional_to_Vt amplifier.

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